WE CLAIM:

1. A disk drive comprising:

(a) a first disk surface and a second disk surface;

(b) an actuator arm;

(c) a first head coupled to a distal end of the actuator arm and positioned over the first disk surface;

(d) a second head coupled to a distal end of the actuator arm and positioned over the second disk surface;

(e) a primary actuator for rotating the actuator arm about a pivot in coarse movements;

(f) a first secondary actuator coupled to the actuator arm for actuating the first head over the first disk surface in fine movements;

(g) a second secondary actuator coupled to the actuator arm for actuating the second head over the second disk surface in fine movements;

(h) a servo controller for:

generating a first control signal applied to the first secondary actuator to position the first head over the first disk surface in fine movements while accessing the first disk surface; and

phase shifting the first control signal by a predetermined phase to generate a second control signal applied to the second secondary actuator to attenuate excitation of at least one arm vibration mode.

2. The disk drive as recited in claim 1, wherein the primary actuator comprises a voice coil motor.

3. The disk drive as recited in claim 1, wherein the first and second secondary actuators comprise a piezoelectric element.

4. The disk drive as recited in claim 1, further comprising:

(a) a first suspension comprising a base end coupled to the actuator arm and a distal end coupled to the first head; and

(b) a second suspension comprising a base end coupled to the actuator arm and a distal end coupled to the second head, wherein:

the first secondary actuator applies an actuating force to the base end of the first suspension; and

the second secondary actuator applies an actuating force to the base end of the second suspension.

5. The disk drive as recited in claim 4, wherein:

(a) the first secondary actuator is coupled to the actuator arm proximate the base of the first suspension; and

(b) the second secondary actuator is coupled to the actuator arm proximate the base of the second suspension.

6. The disk drive as recited in claim 4, wherein:

(a) the first secondary actuator is coupled to a first side of the actuator arm;

(b) a first linkage extends along the first side of the actuator arm and couples the first secondary actuator to the first suspension;

(c) the second secondary actuator is coupled to a second side of the actuator arm;

(d) a second linkage extends along the second side of the actuator arm and couples the second secondary actuator to the second suspension.

7. The disk drive as recited in claim 1, further comprising:

(a) a first mounting bracket for mounting the first head and a second mounting bracket for mounting the second head;

(b) a first suspension comprising a base end coupled to the actuator arm and a distal end coupled to the first mounting bracket; and

(c) a second suspension comprising a base end coupled to the actuator arm and a distal end coupled to the second mounting bracket, wherein:

the first secondary actuator applies an actuating force to the first mounting bracket; and

the second secondary actuator applies an actuating force to the second mounting bracket.

8. The disk drive as recited in claim 1, wherein the predetermined phase is approximately 180 degrees to attenuate excitation of an arm torsion mode.

9. The disk drive as recited in claim 1, wherein the predetermined phase is approximately zero degrees to attenuate excitation of an arm sway mode.

10. A method of attenuating excitation of at least one arm vibration mode in a disk drive, the disk drive comprising a first disk surface and a second disk surface, an actuator arm, a first head coupled to a distal end of the actuator arm and positioned over the first disk surface, a second head coupled to a distal end of the actuator arm and positioned over the second disk surface, a primary actuator for rotating the actuator arm about a pivot in coarse movements, a first secondary actuator coupled to the actuator arm for actuating the first head over the first disk surface in fine movements, and a second secondary actuator coupled to the actuator arm for actuating the second head over the second disk surface in fine movements, the method comprising the steps of:

(a) generating a first control signal applied to the first secondary actuator to position the first head over the first disk surface in fine movements while accessing the first disk surface; and

(b) phase shifting the first control signal by a predetermined phase to generate a second control signal applied to the second secondary actuator to attenuate excitation of at least one arm vibration mode.

11. The method as recited in claim 10, wherein the primary actuator comprises a voice coil motor.

12. The method as recited in claim 10, wherein the first and second secondary actuators comprise a piezoelectric element.

13. The method as recited in claim 10, wherein the disk drive further comprises a first suspension comprising a base end coupled to the actuator arm and a distal end coupled to the first head and a second suspension comprising a base end coupled to the actuator arm and a distal end coupled to the second head, the method further comprising the steps of:

(a) the first secondary actuator applying an actuating force to the base end of the first

suspension; and

(b) the second secondary actuator applying an actuating force to the base end of the second suspension.

14. The method as recited in claim 13, wherein:

(a) the first secondary actuator is coupled to the actuator arm proximate the base of the first suspension; and

(b) the second secondary actuator is coupled to the actuator arm proximate the base of the second suspension.

15. The method as recited in claim 13, wherein:

(a) the first secondary actuator is coupled to a first side of the actuator arm;

(b) a first linkage extends along the first side of the actuator arm and couples the first secondary actuator to the first suspension;

(c) the second secondary actuator is coupled to a second side of the actuator arm;

(d) a second linkage extends along the second side of the actuator arm and couples the second secondary actuator to the second suspension.

16. The method as recited in claim 10, wherein the disk drive further comprises a first mounting bracket for mounting the first head and a second mounting bracket for mounting the second head, a first suspension comprising a base end coupled to the actuator arm and a distal end coupled to the first mounting bracket; and a second suspension comprising a base end coupled to the actuator arm and a distal end coupled to the second mounting bracket, the method further comprising the steps of:

(a) the first secondary actuator applying an actuating force to the first mounting bracket; and

(b) the second secondary actuator applying an actuating force to the second mounting

bracket.

17. The method as recited in claim 10, wherein the predetermined phase is approximately 180 degrees to attenuate excitation of an arm torsion mode.

18. The method as recited in claim 10, wherein the predetermined phase is approximately zero degrees to attenuate excitation of an arm sway mode.